In the mixtures containing 50 and 75 per cent $Mg_2P_2O_7$, some of the crystals showed an undulatory extinction indicating zonal structure. This is what should be expected of crystals formed from melts where perfect equilibrium did not obtain through all the period of crystallization. The lack of equilibrium was evident from the fact that the crystallization of these melts took place with a considerable undercooling. At any rate, the inhomogeneity of the mix-crystals due to zoning is not nearly great enough to arouse suspicion of the separation of two distinct phases. The mixture containing 25 per cent $Mg_2P_2O_7$ shows perfectly homogeneous crystals and the undercooling of the melt is insignificant.

TABLE 3

| COMPOSITION | | BREAKS ON HEATING CURVE (MELTING POINTS) | MEAN REFRACTIVE INDICES |
|---|---|---|---|
| $Mn_2P_2O_7$ | $Mg_2P_2O_7$ | | |
| | | *deg. C.* | |
| 100 | 0 | 1196 | 1.70 |
| 75 | 25 | 1242 | 1.67 |
| 50 | 50 | 1286 | 1.65 |
| 25 | 75 | 1340 | 1.63 |
| 0 | 100 | 1383 | 1.60 |

The optical character of all the mix-crystals is positive. The axial angle varies according to composition. It is large in the mix-crysta's containing 75 per cent $Mn_2P_2O_7$; medium in the 50 per cent crystals and small in the 25 per cent crystals.

The facts stated prove conclusively that the two phosphates are perfectly miscible in the solid state and that the system $Mg_2P_2O_7$:$Mn_2P_2O_7$ belongs to Roozeboom's Type I, the type without a maximum or minimum.

BOTANY.—*The name of the wood-apple, Feronia Limonia.* Walter T. Swingle, Bureau of Plant Industry.

The wood-apple of India, Ceylon, and Farther India is a deciduous tree with odd-pinnate leaves and globose fruits about the size of an orange, with a hard, woody rind. It belongs to the orange subfamily, Citratae, of the Rutaceae and is one of the

typical hard-shelled citrous fruits, a group including the genera Feroniella, Aegle, Chaetospermum, Balsamocitrus, and Aeglopsis, with a range from Indo-China and the Philippine Islands to West Africa.

The wood-apple was first given a binomial name by Linnaeus in 1753 as *Schinus Limonia* (Sp. Pl. **1**:389), with citation to a rather full description drawn up by Linnaeus himself and published, in 1747, in his account of Hermann's herbarium of Ceylonese plants (Fl. Zeyl., pp. 77, 78, No. 175). Hermann's herbarium, now in the Botanical Department of the British Museum, shows that the specimens studied by Linnaeus and labeled by his own hand consist of two sterile twigs of the wood-apple. In addition to this material there are in Linnaeus' own herbarium two twigs with flowers and loose leaves of this plant, labeled "Limonia" in Linnaeus' handwriting. It is clear that Linnaeus studied both flowers and foliage from his description in Flora Zeylanica which he concludes as follows: "Ex flore & facie ad hoc genus plantam retuli."

Now, Linnaeus attempted to collate in his Flora Zeylanica what had been published previously on tropical and especially East Indian botany and in this case added references to some seven previously published descriptions which he considered to be synonymous but which represent three or four distinct species belonging to as many genera. Two plates are cited, one in Rumphius (Herb. Amboin. **2**: 134, *pl. 43*) representing a branch of the wood-apple with flowers and young fruit, and one in Rheede (Hortus Malabaricus **4**: 31, *pl. 14*) representing a branch with flowers and mature fruits (also a section of fruit and seeds) of quite a different plant, *Hesperethusa crenulata* (Roxb.) Roemer, commonly but erroneously called *Limonia acidissima* L.

The type of *Schinus Limonia* L. is certainly the plant described by Linnaeus in his Flora Zeylanica, the wood-apple, notwithstanding the citation of quite different species of previous authors as synonyms. This is shown unmistakably not only by the type specimens in the Hermann and Linnaean herbaria but also by Linnaeus' description in Flora Zeylanica (p. 78) which says: "foliola . . . . *emarginata*" which phrase cannot possibly

apply to any of the other plants of which descriptions are cited by Linneaus in the synonomy. This fact was first pointed out by Trimen,[1] in 1887, on the basis of the specimens preserved in Hermann's herbarium. Apparently he did not know of the existence of the flowering specimen in Linnæus' own herbarium.

In 1762, Linnaeus, in the first volume of the second edition of his Species Plantarum, abandons the name *Schinus Limonia*, restricting the genus Schinus to the Peruvian pepper trees and creating a new genus, Limonia, for the wood-apple which he calls *Limonia acidissima*. He does not cite the *Schinus Limonia* of the first edition of Species Plantarum as a synonym, but his use of the former specific name as the generic name and the reference to his previous description in Flora Zeylanica make it clear that *Limonia acidissima* L. is merely another name for *Schinus Limonia* L. The original specific name could not be retained without forming a duplicate binomial, a barbarism which Linnaeus never countenanced.

Four citations are given under *Limonia acidissima*. The first is to Burman's Thesaurus Zeylanicus, p. 143, which includes two or more species, one of them being very probably the common lime *Citrus aurantifolia* (Christm.) Swing. The second citation is to his own Flora Zeylanica, p. 77, 78, and certainly applies to the wood-apple. The third citation is to Rumphius Herbarium Amboinense, vol. 2, *pl. 43*, which is also the wood-apple or a closely allied species. The fourth citation is to Rheede, Hortus Malabaricus, Pt. 4, *pl. 14*, and is *Hesperethusa crenulata* (Roxb.) Roem.

Linnaeus thus confused several very distinct plants under his *Limonia acidissima*. Unfortunately, practically all post-Linnaean authors apply this name to a small-fruited Indian tree, *Hesperethusa crenulata* (Roxb.) Roem., while the wood-apple is commonly called *Feronia elephantum* Corrêa.

Fortunately, the confusion that would be caused by changing the current application of the name Limonia and applying it to the wood-apple can be avoided, because the name Limonia proves to

[1] Trimen, H. Hermann's Ceylon Herbarium and Linnaeus's "Flora Zeylanica," in Journ. Linn. Soc. Bot., **24**: 142 (n. 160, 28 Nov. 1887).

be invalid, being a mere variant of Limonium. Linnaeus in the 1754 edition of Genera Plantarum, (ed. 5, p. 135) reduced the latter name to a synonym of Statice, and consequently this name or any variant of it cannot be revived for any plant not congeneric with the type of the original Limonium.[2] As a matter of fact, Limonium has recently been resuscitated in its original sense and is now so used by many taxonomists.

Even if we assume that Linnaeus with his well-known aversion to barbarous names[3] had latinized the name Limon, the usual pre-Linnaean name of the lemon, we would still be forced to conclude that he had brought it into a correct Latin form, just as he did in changing Anona, derived from an aboriginal American name, to Annona, a classical Latin word.[4] This would mean that he had transferred Pliny's Latin name Limonia[5] to a quite different plant, the East Indian wood-apple, in accordance with a reprehensible practice often followed by him. In this case, the Latin name Limonia would still be a mere variant of Limonium, even though derived indirectly from the barbarous word Limon.

Limonia then being invalid, the next oldest generic name must be taken up. This is Feronia, published by Corrêa in 1800, the name now commonly used.

Since the wood-apple was first published as *Schinus Limonia* by Linnaeus in 1753, the oldest valid name of the wood-apple is *Feronia Limonia* (L.) n. comb.

[2] Cook, O. F. Nomenclature of the Sapote and the Sapodilla, in Contrib. U. S. Nat. Herb. **16**: 282 (no. 11, December 13, 1913).

[3] Linnaeus, C. Philosophia Botanica, p. 163, ¶ 229, Stockholm., 1751.

[4] Safford, W. E. The genus Annona: The derivation of its name and its taxonomic subdivisions. This JOURNAL **1**: 118 (n. 4, September 19, 1911).

[5] Limonia and Limonium were both used by Pliny as names of plants and were derived from the Greek λειμωνία and λειμώνιον, the feminine and neuter forms of the adjective λειμώνιος from ὁ λειμών a grassy plain, meadow, prairie. The Greeks used both the feminine and the neuter forms as substantives, ἡ λειμωνία being a kind of anemone, τὸ λειμώνιον a Statice, both plants characteristic of meadows. The feminine and neuter forms of the adjective were so differently accentuated in Greek that there was no danger of confusing the two words when used as substantives. In Latin this difference in accent was lost and confusion rendered possible. It is noteworthy that even in Greek only one of the similarly accented masculine and neuter forms of the adjective (λειμώνιος and λειμώνιον) was used as a noun.